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Economic Analysis of Local Day-Old Chicken Products at Cianjur District-West Java

Taslim Dawan[a*], Sjafril Darana[b], Wendry Setiyadi Putranto[c], [a,b,c]Faculty of Animal Husbandry, Universitas Padjadjaran, Jalan Raya Bandung- Sumedang KM. 21, 45363, Sumedang-West Java, Indonesia, Email: [a*]taslim.dawan@yahoo.com

This research aims to analyse local Day Old Chicken (DOC) products and the impact of production factors at Jimmy's farm hatchery in Cianjur district, West Java. The method employed in this research is case study, conducted through direct interviews. The research location was intentionally selected through purposive sampling. The collected data was analysed by using Output Unit Cobb-Douglas Production Function (OU-CDPF) technique via multiple regression (Econometric Views/Eviews software tool), and then followed by f-test and t-test. The results showed that the average local sales of the DOC product were 38,908 head/month, with an income of Rp 93,606,002.00 per month. Based on multiple linear regression analysis, the equation obtained is $\hat{Y}$ =7.813+2.742X1-0.641X2-1.793X3+0.023X4+0.004X5+0.050X6.
The determination coefficient value (R2) is 0.930. The business economic analysis of DOC hatching products was able to be explained by the number of fertile eggs, labour costs, electricity costs, cost of vaccines/drugs, fumigation costs and packing fees by as much as 93%, while the remaining 7% was influenced by outside variables. Through f-test, the independent variables (the number of fertile eggs, labour costs, electricity costs, cost of vaccines/medicine, fumigation costs and packaging costs) significantly impact the dependent variables at 0.05. Based on t-test of DOC, the hatching production factor was significantly influenced by the number of fertile eggs and electricity costs, while the other costs (labour costs, vaccine/medicine, fumigation and packaging costs) were not significant on the hatchery business. The more fertile eggs that were incubated, the more DOC were produced. Nevertheless, the electricity using was involved give expenditure cost determine.

Keywords: *Business Economic Analysis, Egg Hatchery, DOC Local Product, Multiple Regression.*

Introduction

The increasing number of local poultry businesses, followed by local chicken hatch development, hatching eggs model in natural way in fact only able to incubate in relatively small number.. Thanks to technology, nowadays thousands of eggs can be hatched in only one incubator. An egg hatching machine is actually more effective and efficient than mother hens and the success rate is also high if the egg is hatched by a hatching machine (North, M.O. 1984)

The result showed that local egg hatchery business opportunities are very promising and need to be developed, although the price is higher than commercial chickens, market demand for eggs and chicken meat continues to increase. Unfortunately, this market demand is not met by the availability of DOC (Day Old Chicken) production (Blair, R. 2008)

Hatching chicken eggs is easier than hatching duck eggs because hatching duck eggs requires higher air humidity. In terms of time, chicken eggs requires 21 days to hatch, while duck eggs need 28 days. Therefore, in terms of operational costs, hatching chicken eggs is more cost-effective. A chicken hatchery business is mostly run as a side business by households with small scale and medium enterprises and large enterprises. Before starting a chicken hatchery business, it is important to consider what type of chicken eggs will be hatched (Blair, R. 2008).

An egg hatchery business using a hatching machine is not simple, considering it takes quite a lot of experience and flight hours to be able to maximise the hatching results. Currently, hatchery machines are widely known and some of them are sophisticated. The main principle of a hatchery machine is to keep the heat and humidity inside the machine during the incubation process, where the duration of the incubation time is 21 days. The next several days are for the egg hatching process, which is usually 3-5 days. In total, the time required is 21-26 days.

There are two solutions to the problems of hatchery marketing. The first solution is that the chickens are farmed separately and then sold to the chicken slaughterhouse or to local chicken breeders. The second solution is to sell the chickens directly to local chicken farmers. Both solutions have the same source, but the purpose of this business is to help the market demand of local chicken meat. This business is to pursue market segmentation in the area of local chickens at local poultry farming producers. Local chicken breeders are farmers who keep local chickens as local chicken suppliers. For example, Jimmy's Farm in Cipanas area of Cianjur regency, West Java, Indonesia.

An eggs hatchery business can run if the supply of eggs is smooth and the process of incubating eggs using decent hatching machines is good enough. This business requires local chicken eggs. Local chicken eggs are not readily available because local chickens are not bred in a cage. This condition resulted in a lower percentage of laying hens compared to broilers. The

experience in dealing with local chicken meat is related with the continuity of local chicken eggavailability. On the other hand, related to the hatching percentage ability is still below which preferable 75 percent up until more than 90 percent. Knowledge can be gained through learning from other entrepreneurs, reading books and from personal experience.

Local hatchery business require various production factors, such as hatching machines, hatching eggs, electricity, equipment, labour, vaccines/vitamins, fumigation and packing. A hatching machine is the main part in the whole process of hatching eggs. Hatching eggs should be selected based on standard hatching eggs of good quality. Implementation of hatching is supported by electricity as the energy resources and the equipment to support production activities. Manpower is a human resource that serves to carry out the hatchery process from egg selection to DOC hatching. Vaccine serves to provide chickens with immunity to diseases. Fumigation is a pest control method commonly used in pest management.

The skills required in this business are selecting eggs, candling and setting up the machine. All of these skills are required by a poultry owner. These skills are developed through partners business information and through experience.

The final stage of hatching is evaluation, including fertility, mortality and hatchability. Fertility is the ratio of the number of fertile eggs to the number of successfully hatched eggs in percentage. Mortality is the number of dead embryos during the hatching process in percentage. Hatchability is the number of eggs hatched from a group of fertile eggs in percentage, according to Rasyaf (2002).

This research aims to: (1). Describe the techniques and the economy of Jimmy's Farm as a local chicken hatchery business (2). Analyse the local Day Old Chicken income of Jimmy's Farm production, Cipanas area, Cianjur regency, West Java, Indonesia.

Object and Research Methods

The objects of this research are the stock of local chicken eggs and Day Old Chicken (DOC) product from Jimmy's Farm, Cianjur regency, West Java. The method employed in this research is case study, which is a research method that maintains the integrity of the unit being analysed (Paturochman, 2005). Case study is conducted by thoroughly investigating the subject or object of research. The object of this case study was chosen to find out how much capacity to explain in order to provide detailed information.

This research was conducted at CV. Jimmy's Farm. The research location was intentionally selected (purposive sampling). The company was selected due to the fact that it is the largest local poultry in Cianjur that can produce ± 8,500-10,000 DOC per week.

The data collected consists of primary and secondary data. Primary data was obtained through observation and direct interviews with the owner of the local chicken egg hatchery and employees involved in the process. Based on the interviews, descriptions of the activities and financing of production were obtained.

Secondary data was obtained through the company's monthly reports and from related institutions. In this study the secondary data used in the period of time between May 2015-April 2016, such as egg production data, expenses and DOC sales. Secondary data is the information from the books of scientific literature related to the problems that became the study focus and the tracing of previous studies that have been done.

The variables in the study include fertile egg cost, labour, electricity, vaccines, fumigation and packaging. The number of local fertile chicken eggs (X1) is the number of selected fertile eggs ready to be hatched. Labour cost (X2) is the per month labour expense. Electricity cost (X3) is the expense of electricity consumed per month for the hatchery. Vaccine cost (X4) is the amount of expenses incurred per month for the purposes of DOC vaccination. Fumigation cost (X5) is monthly expense of sterilising eggs before being hatched. Packaging cost (X6) is the amount of expenses incurred for DOC shelter packaging marketing and the number of local chicken DOC hatching in a tail unit (Y) is the result of local fertile chicken eggs that were hatched.

Data Analysis Techniques

The first technique is sescriptive analysis, which is the hatching of local chicken eggs at Jimmy's Farm, Cipanas area,Cianjur Regency, West Java, Indonesia. Based on income analysis cost and income of local chicken hatching, it can be calculated by using the following formula (Soekartawi, 2003):

$\boldsymbol{\pi}$ = TR - TC
$\boldsymbol{\pi}$ = Income

TR = Total Revenue
TC = Total Cost

The second technique is statistical analysis, which includes production factors that impact the DOC product of a local chicken egg hatching business. The second analysis was tested by using the classical production function through Cobb-Douglas Production Function (OUP-CDPF) model as a model of multiple regression analysis with the Softwart Econometric Views (Eviews) tool. The solution relationship between Y and X is by means of regression, i.e. the

variation of Y will be influenced by the variation of X through the estimation model using Cobb-Douglas function, and presented as following:

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e_i$

Information

Y = The number of local chicken DOC (Rp / month)
a = constants
b = regression coefficient
X_1 = the number of fertile eggs (egg/month)
X_2 = labour cost (Rp/month)
X_3 = electricity cost (Rp/month)
X_4 = vaccine and vitamin cost (Rp/month)
X_5 = fumigation cost (Rp/month)
X_6 = packaging cost (Rp/month)
E_i = confounding factors

The equation is converted into multiple linear form by mutually equating the statistical test to determine the significance level in order to facilitate the estimation of the above equation. The logarithmic form of the equation is (Soekartawi, 2003):

$\text{Log } Y = \text{Log } a + b_1 \log X_1 + b_2 \log X_2 + ...bn \log Xn + u$

The coefficients of each variable used were then tested for classical assumptions and statistical tests to determine the significance level.

The statistical tests performed include the tests of F, R^2, and t. F test (Fisher test) were used to know the influence of independent variables together to dependent variable significantly or not (Gujarati, 1999).

R^2 (the coefficient of determination) is used to show how high the variances of independent variables can be explained by the variance of the dependent variable. The value of R^2 can be calculated as follow (Gujarati, 1999):

$$R^2 = \frac{ESS}{TSS} = \frac{RSS}{1-TSS} \qquad TSS = \frac{1-\sum ei2}{\sum yi}$$

t-test is used to test the significant influence of each independent variable (Gujarati, 1999). Ho is rejected if t arithmetic > t table or t arithmetic < -t table meaning it is significant. Ho is accepted if - t table < t count meaning it is not significant.

Results and Discussion

Production Cost of Local Chicken Hatchery

The production costs of a local chicken hatchery include fixed cost and variable cost (non-fixed cost). The total production cost is presented in Table 1.

Table 1: Total Production Cost of the Local Chicken Hatchery of Jimmy's Farm.

Description	Total/Year (Rp)	Percentage (%)
Fixed cost		
Depreciation cost of building	2,108,333.33	0.11
Depreciation cost of tool	1,813,642.86	0.10
Machine cost	7,699,110.63	0.41
Land cost	564,000.00	0.03
The fixed charge amount	**12,185,086.82**	**0.65**
Non-fixed costs (Variable costs)		
Purchase of hatching eggs	1,621,745,000.00	86.73
Labour cost	109,720,000.00	5.87
Electricity cost	67,265,040.00	3.60
Packaging cost	24,508,000.00	1.31
Vaccine/medicine cost	20,631,250.00	1.10
Machine maintenance cost	9,935,000.00	0.53
Fumigation cost	2,203,200.00	0.12
Generator fuel cost	1,684,000.00	0.09
Total variable costs	**1.857,691,490.00**	**99.35**
Total costs	**1,869,876,576.82**	**100**

The highest fixed cost of other receivables consists of machinery purchase and building costs. The depreciation value of the building is the initial value of making the hatchery building in cash less the final value of the building after it is no longer used. Then divided by building durability, building depreciation Rp. 2.108.333,33/year or 0.11% from the total cost of production, depreciation of the machine from the initial value of purchases less the final value of the machine after it is no longer used then divided by the length of machine use. Depreciation of machine Rp. 7,699,110.63 / year or 0.41% from total production cost. The egg storage need cost Rp 1.813.642,86/year or 0.10% from total production cost.

The largest variable cost in Table 1. is the purchase of hatching eggs, followed by labour and then electricity costs. The cost of buying hatching eggs is Rp. 1,621,745,000.00 / year or 86.73% of total production cost. Electricity is used for heating, egg rotation and for lighting, with the electricity costs beingRp 67,265,040.00 / year or 3.60% of total production cost. The

power source for the hatchery building (hatchery) comes from State Electricity Enter price substation which can meet the power demand of 10,000 watts. In addition, Jimmy's Farm has a generator set with a capacity of 10,000 watts that can serve as a replacement power source and is used in case of interruption or blackout. Labour mostly comes from indigenous people around Gadog Village. This is one form of corporate responsibility to the welfare of the community by opening employment for residents around the company with a given wage. The labour cost is Rp 1,097,200,000.00 / year or 5.87% of the total production cost, where all of the worker which come from around Jimmy's Farm enterprise. This prudence is done by them as the responsibility in community welfare. Variable cost appears greater than fixed cost, because in variable costs the purchase cost of hatching eggs occupied the highest percentage or the largest of total cost. The variable cost is greater than the fixed cost, because in variable costs there is the purchase cost of hatching eggs which occupies the highest percentage or the largest in total cost.

The Income of Local Chicken Egg Hatchery Business

The income of local chicken eggs hatchery is all of revenue which comes from DOC production. The income of infertile eggs and eggshell waste which come from Jimmy's Farm is not calculated, because all of this is given to the workers.

In Table 2 it can be seen that income comes from sales of local chicken DOC products and that DOC sales consist of two forms of sales. Firstly the sale DOC out (Sell Out) to the breeder farmers outside the hatchery location with an average price of Rp 6417.70 per head. Secondly, it is done by enlargement at the location where the hatch itself (sell In) with an average price of Rp 6400.00 per head.

Table 2: Total Income of Local Chicken DOC at Jimmy's Farm

Information DOC Income	Average price (Rp)	Total/Year (chick)	Total/Year (Rp)
DOC Sales (*Sell Out*)	6417.70	283.317	Rp 1,818,243,300.00
DOC Sales (*Sell In*)	6400.00	183.579	Rp 1,174,905,600.00
Total Income		466.896	Rp 2,993,148,900.00

Egg hatching activity produces chicks at one day of age (Day Old Chicks), and the sale of DOC per year 466,896 or 38,908 tails per month, and receipt sales Rp 2.993.148.900,00 per year or the average of Rp 249,429,075 per month.

Farmer Income

The amount of revenue is calculated by using cost and revenue analysis. The income analysis obtained from the calculation of the difference between income and production cost is Rp (2,993,148,900.00 - 1,869,876,576.82) = Rp 1,123,272,022.98 per year, so the monthly income is Rp 93,606,002.00. The results of the description analysis about the average income of hatching eggs can provide a clear picture in the development of Jimmy's Farm business even though the business requires greater production costs. Large production costs and balanced with business scale, the level of income will be even greater if the management system is done optimally (Triana et al., 2007).

Regression Analysis

The research used multiple linear regression method in the hypothesis proposed test by computer program Eviews 7. The result of analysis in Table 3 obtained the regression equation as follows:

$$\hat{Y} = 7.813 + 2.742X_1 - 0.641X_2 - 1.793X_3 + 0.023X_4 + 0.004X_5 + 0.050X_6$$

Table 3: Multiple Regression Analysis Result

Variable	Regression coefficient	t count	Prob. (sig. t) $\alpha = 0.05$
X_1 (fertile egg)	2.742612153	3.926354408	0.011110874
X_2 (labour cost)	-0.641272756	-0.736747997	0.494370475
X_3 (Electricity cost)	-1.793006796	-2.619596164	0.047120716
X_4 (Vaccine cost)	0.023054277	0.759237174	0.48194995
X_5 Fumigation cost)	-0.000465481	-0.005719399	0.995657784
X_6 (Packing cost)	0.050655436	1.164844396	0.296629798
Constants	7.813427893	1.134138711	0.308166402
F Count	11.21063136		
Adjust R^2	0.847779915		
R Square (R^2)	0.930809052		
Dependent variable Y			

Based on the equation, each variable can be described the effect on the amount of DOC production from Jimmy's Farm hatchery.

Test F is a tool to test whether the independent variable affects collectively the dependent variable. Regression result of variable DOC number of local chicken (Y) influenced by variable (X1) number of fertile eggs, (X2) labour cost, (X3) electricity cost, (X4) vaccine cost, (X5)

fumigation cost, and (X6) packing cost with F value calculate is 11,210 while F table is 2.55. So it can be determined that F value calculate bigger than F table at α = 0,05 level. Based on these calculations it can be explained, that the independent variables (number of fertile eggs, labour costs, electricity costs, the cost of vaccines and vitamins, fumigation costs, and packing costs) influence the dependent variable (the number of local chicken DOC).

Based on the regression result, the determinant coefficient (R^2) value 0.93, it means that the magnitude of all independent variables affects the dependent variable on DOC production amount to 93% i.e. the number of DOC local chicken influenced by independent variables studied (number of fertile eggs = X_1 ; labour cost = X2 ; electricity cost = X3; vaccine and vitamin cost = X4 ; fumigation cost = X5 ; and packing cost = X6), while the remaining 7% is obtained from the impact caused by other variables which are not researched or included in the disturbance error.

From result of t-test it can be stated that the alleged free variables (X_1, X_2, X_3, X_4, X_5 and X_6) can influence the production of DOC (Y). The significance level of each coefficient can be tested by using partial test of t-test. By looking at Table 3, it can be explained that t-test variables of fertile eggs count (X_1), labour cost (X_2), electricity cost (X_3), vaccine and vitamin cost (X_4), fumigation cost (X_5), and packing cost (X_6).

The variable of fertile eggs number (X_1) has a positive impact on DOC production (Y) and gets the t - count value 3,926 with t - table 1,895, because t value count higher than t - table (2,926 > 1,895). Based on the calculation it can be explained that the number of fertile eggs positively affects DOC production. According to Cahyono (2011), increasing number of fertile eggs in the hatching process can increase the number of DOCs over time. This will increase revenue, thus giving a positive effect on revenue. The positive impact on the number of fertile eggs with a coefficient result of 2.74 can be interpreted that if the number of fertile eggs rose 10 percent then it can increase the number of DOC as much as 27 percent.

The variable of labour cost (X_2), electricity cost (X_3), and fumigation cost (X_5) negatively impact DOC production (Y). Based on t–test, only electricity cost (X_3) has a significant impact on DOC production (Y), because t-count value equals to 2,619 with t-table equal to 1,895. It means that the value of t arithmetic is higher than t-table (2.619 > 1.895). The negative effect of electricity cost associated with coefficient value generated equal to -1.79 can be interpreted, if the electricity cost increases 10 percent, hence can decrease the amount of DOC equal to 17 percent, that it can decrease the income.

The variable costs of vaccine and vitamin (X_4) and packing cost (X_6) have a positive effect on the amount of DOC (Y) production based on non-significant t–test. Since the t-count value is 0.759 with t-table 1.895 (0.759 <1.895) and 1.164 (1.164 <1.895). Based on the calculation it

can be determined that the cost of vaccine and vitamins (X_4) and packing costs (X_6) have no effect on production amount of DOC (Y).

Conclusion

General Conclusion

The existence of the number of hatching eggs has a significance positive impact on DOC production, while the electricity cost has a significant negative impact on DOC production.

Special Conclusion

a. In every addition of 10 percent of fertile eggs, DOC production will increase as much as 27 percent.
b. In every addition of 10 percent of electricity charge, the revenue amount will be reduced by as much as 17 percent.

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